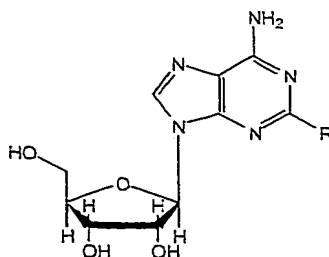


Claims

1. A method of synthesising a 2-substituted adenosine of formula I, which comprises converting 2-nitro-pentabenzoyl adenosine to the 2-substituted adenosine:



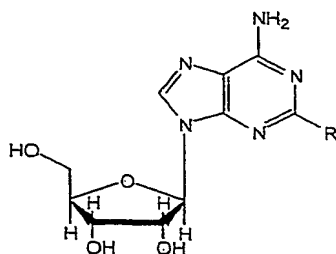
I

wherein R = C₁₋₆ alkoxy (straight or branched), a phenoxy group (unsubstituted, or mono-, or di-substituted by halo, amino, CF₃-, cyano, nitro, C₁₋₆ alkyl, or C₁₋₆ alkoxy), a benzyloxy group (unsubstituted, or mono-, or di-substituted by halo, amino, CF₃-, cyano, nitro, C₁₋₆ alkyl, or C₁₋₆ alkoxy), or a benzoyl group (unsubstituted, or mono-, or di-substituted by halo, amino, CF₃-, cyano, nitro, C₁₋₆ alkyl, or C₁₋₆ alkoxy).

2. A method according to claim 1, wherein R = methoxy, ethoxy, propoxy, butoxy, pentyloxy, hexyloxy, phenoxy, benzyloxy, or benzoyl.
3. A method according to claim 1 or 2, wherein 2-nitro-pentabenzoyl adenosine is converted to the 2-substituted adenosine by deprotection, and reaction with C₁₋₆ alkoxide anion, or a phenoxide anion.
4. A method according to claim 3, wherein the anion is methoxide anion produced from MeOH/NaOMe, MeOH/n-BuLi, MeOH/NaOH, MeOH/NaH, or MeOH/KO^tBu.
5. A method according to any preceding claim, which further comprises converting pentabenzoyl adenosine to 2-nitro-pentabenzoyl adenosine.

6. A method of synthesising 2-nitro-pentabenzoyl adenosine which comprises converting pentabenzoyl adenosine to 2-nitro-pentabenzoyl adenosine.
7. A method according to claim 5 or 6, wherein pentabenzoyl adenosine is converted to 2-nitro-pentabenzoyl adenosine by nitrating pentabenzoyl adenosine using tetrabutylammonium nitrate (TBAN), or tetramethylammonium nitrate (TMAN) as nitrating reagent.
8. A method according to claim 7, which further comprises reducing the amount of TBAN or TMAN contaminating the 2-nitro-pentabenzoyl adenosine after the nitration reaction.
9. A method according to claim 8, wherein the amount of TBAN or TMAN is reduced by washing the 2-nitro-pentabenzoyl adenosine with water.
10. A method according to claim 9, which further comprises recrystallising the 2-nitro-pentabenzoyl adenosine after washing with water.
11. A method according to any of claims 5 to 10, which further comprises converting adenosine to pentabenzoyl adenosine.
12. A method of synthesising pentabenzoyl adenosine or 2-nitro-pentabenzoyl adenosine which comprises converting adenosine to pentabenzoyl adenosine.
13. A method according claim 11 or 12, wherein adenosine is benzoylated using benzoyl chloride.
14. 2-nitro pentabenzoyl adenosine.
15. Use of 2-nitro pentabenzoyl adenosine in the synthesis of a 2-substituted adenosine of formula I.
16. Use of pentabenzoyl adenosine in the synthesis of 2-nitro-pentabenzoyl adenosine, or a 2-substituted adenosine of formula I.

17. Use of a benzoylating reagent in the synthesis of a 2-substituted adenosine of formula I.
18. A method of reducing the amount of TBAN or TMAN contaminating 2-nitro-pentabenzoyl adenosine formed by nitration of pentabenzoyl adenosine with TBAN or TMAN, which comprises washing the 2-nitro-pentabenzoyl adenosine with water.
19. A method according to claim 18 which further comprises recrystallising the 2-nitro-pentabenzoyl adenosine after washing with water.
20. A method of synthesising a 2-substituted adenosine of formula I, which comprises: nitrating adenosine pentaacetate using tetrabutylammonium nitrate (TBAN) or tetramethylammonium nitrate (TMAN) to produce 2-nitroadenosine pentaacetate; reducing the amount of TBAN or TMAN contaminating the 2-nitroadenosine pentaacetate; and then producing the 2-substituted adenosine from the 2-nitroadenosine pentaacetate:



I

wherein R = C₁₋₆ alkoxy (straight or branched), a phenoxy group (unsubstituted, or mono-, or di-substituted by halo, amino, CF₃-, cyano, nitro, C₁₋₆ alkyl, or C₁₋₆ alkoxy), a benzyloxy group (unsubstituted, or mono-, or di-substituted by halo, amino, CF₃-, cyano, nitro, C₁₋₆ alkyl, or C₁₋₆ alkoxy), or a benzoyl group (unsubstituted, or mono-, or di-substituted by halo, amino, CF₃-, cyano, nitro, C₁₋₆ alkyl, or C₁₋₆ alkoxy).

21. A method according to claim 20, wherein the amount of TBAN or TMAN contaminant is reduced by triturating the 2-nitroadenosine pentaacetate with isopropanol and washing the triturated 2-nitroadenosine pentaacetate with water.

22. A method according to claim 20 or 21, wherein the 2-substituted adenosine is produced from the 2-nitroadenosine pentaacetate by deprotecting the 2-nitroadenosine pentaacetate and reaction with a C₁₋₆ alkoxide anion or a phenoxide anion.

23. A method according to any of claims 20 to 22, wherein the 2-substituted adenosine is 2-methoxy adenosine, and this is produced from the 2-nitroadenosine pentaacetate by reaction with methoxide anion from methanol/NaOMe, methanol/n-BuLi, methanol/NaOH, methanol/NaH, or methanol/KO^tBu.

24. A method according to any of claims 20 to 23, which further comprises synthesising the adenosine pentaacetate by acylating adenosine.

25. A method according to claim 24, wherein the adenosine is acylated to form an O-tri-acetyl and/or tetra-acetyl derivative of adenosine, the derivative(s) is isolated, and the isolated derivative(s) is acylated to produce adenosine pentaacetate.

26. A method according to claim 24 or 25 which further comprises washing the adenosine pentaacetate to remove contaminating adenosine tetraacetate before nitrating the washed adenosine pentaacetate to form the 2-nitroadenosine pentaacetate.

27. A method of synthesising a 2-substituted adenosine of formula I, which comprises acylating adenosine to form an O-tri-acetyl and/or tetra-acetyl derivative of adenosine, isolating the derivative(s), acylating the isolated derivative(s) to produce adenosine pentaacetate, and producing the 2-substituted adenosine from the adenosine pentaacetate.

28. A method according to claim 27 which further comprises washing the adenosine pentaacetate to reduce the amount of contaminating adenosine tetraacetate before producing the 2-substituted adenosine from the washed adenosine pentaacetate.

29. A method of synthesising a 2-substituted adenosine of formula I, which comprises acylating adenosine, or an acylated derivative of adenosine, to form adenosine pentaacetate, washing the adenosine pentaacetate to reduce the amount of contaminating adenosine tetraacetate, and producing the 2-substituted adenosine from the washed adenosine pentaacetate.
30. A method according to any of claims 27 to 29, which further comprises nitrating the adenosine pentaacetate to produce 2-nitroadenosine pentaacetate, and producing the 2-substituted adenosine from the 2-nitroadenosine pentaacetate.
31. A method according to claim 30, wherein the 2-substituted adenosine is 2-methoxyadenosine, and is produced by reacting methoxide anion from methanol/NaOMe, methanol/n-BuLi, methanol/NaOH, methanol/NaH, or methanol/KO^tBu with the 2-nitroadenosine pentaacetate.
32. A method according to any of claims 20, 21, or 30 which further comprises converting 2-nitroadenosine pentaacetate to 2-chloroadenosine pentaacetate before producing the 2-substituted adenosine from the 2-chloroadenosine pentaacetate.
33. A method of synthesising a 2-substituted adenosine, which comprises converting 2-chloroadenosine pentaacetate to the 2-substituted adenosine.
34. A method according to claim 33, which further comprises producing the 2-chloroadenosine pentaacetate from 2-nitroadenosine pentaacetate.
35. A method according to any of claims 32 to 34, wherein the 2-substituted adenosine is 2-methoxyadenosine, and the 2-chloroadenosine pentaacetate is converted to 2-methoxyadenosine by reaction with methoxide anion from methanol/NaOMe, methanol/n-BuLi, methanol/NaOH, or methanol/NaH with the 2-nitroadenosine pentaacetate.
36. A 2-substituted adenosine synthesised by a method according to any of claims 20 to 35.

37. A method of synthesising 2-methoxyadenosine, which comprises reacting methoxide anion from methanol/NaOMe, methanol/n-BuLi, methanol/NaOH, methanol/NaH, or methanol/KO^tBu with 2-nitroadenosine pentaacetate.
38. A method of synthesising 2-methoxyadenosine, which comprises the steps shown in scheme 1 or 2.
39. A method of synthesising 2-methoxyadenosine, which is substantially as described.
40. 2-methoxyadenosine which is >96% pure.
41. A method of synthesising 2-nitroadenosine pentaacetate, which comprises nitrating adenosine pentaacetate using TBAN or TMAN to produce 2-nitroadenosine pentaacetate, and reducing the amount of TBAN or TMAN contaminating the 2-nitroadenosine pentaacetate.
42. A method according to claim 41, wherein the amount of TBAN or TMAN contaminant is reduced by triturating the 2-nitroadenosine pentaacetate with isopropanol and washing the triturated 2-nitroadenosine pentaacetate with water.
43. A method of synthesising adenosine pentaacetate, 2-nitroadenosine pentaacetate, or a 2-substituted adenosine of formula I, which includes the following steps: acylating adenosine to form an O-tri-acetyl and/or tetra-acetyl derivative of adenosine, isolating the derivative(s), and acylating the isolated derivative(s) to produce adenosine pentaacetate.
44. A method of synthesising adenosine pentaacetate, 2-nitroadenosine pentaacetate, or a 2-substituted adenosine of formula I, which includes the following steps: acylating adenosine or an acylated derivative of adenosine to form adenosine pentaacetate; and washing the adenosine pentaacetate to reduce the amount of contaminating adenosine tetraacetate.